Genome Rearrangement: Graphs and Matrices

Joshua Cooper, University of South Carolina
*Jeffrey Davis, Emory University**

We apply matrix theory over F_2 to understand the nature of so-called "*successful pressing sequences*" of black-and-white vertex-colored graphs. These sequences arise in computational phylogenetics, where, by a celebrated result of Hannenhalli and Pevzner, the space of sortings-by-reversal of a signed permutation can be described by pressing sequences. In particular, we offer several alternative linear-algebraic and graph-theoretic characterizations of successful pressing sequences, describe the relation between such sequences, and provide bounds on the number of them. We also offer several open problems that arose as a result of the present work.